AMENDMENTS TO THE CLAIMS

Please amend Claims 1 and 33, cancel Claims 48-50 and add Claims 64-66 as follows:

1. (Currently amended) A method for metallizing an integrated circuit, the method comprising

depositing a diffusion barrier on a substrate;

oxidizing a top layer of the diffusion barrier to form a metal oxide layer, wherein the oxidizing forms the metal oxide layer from metal in the diffusion barrier;

reducing the oxidation state of the metal oxide layer formed by oxidizing [[a]] the top layer of the diffusion barrier to form a first seed layer; and

depositing a conductor directly on the first seed layer.

2. (Original) The method of Claim 1, wherein depositing a diffusion barrier layer comprises an atomic layer deposition process.

3. (Original) The method of Claim 1, wherein depositing a diffusion barrier comprises depositing a metal nitride layer.

4. (Original) The method of Claim 3, wherein depositing a diffusion barrier comprises depositing a tantalum nitride layer.

5. (Original) The method of Claim 1, wherein depositing a diffusion barrier comprises depositing a metal carbide layer.

6. (Original) The method of Claim 6, wherein depositing a diffusion barrier comprises depositing a tungsten carbide layer.

7. (Original) The method of Claim 1, wherein depositing a diffusion barrier comprises depositing a metal nitride carbide layer.

8. (Original) The method of Claim 7, wherein depositing a diffusion barrier comprises depositing a tungsten nitride carbide layer.

9. (Original) The method of Claim 7, wherein depositing a diffusion barrier comprises depositing a molybdenum nitride carbide layer.

10. (Original) The method of Claim 1, wherein oxidizing the top layer of the barrier layer comprises exposing the barrier layer to an oxygen source chemical.

11. (Original) The method of Claim 10, wherein the oxygen source chemical is selected from the group comprising air, diatomic oxygen, ozone, oxygen radicals, and hydrogen peroxide.

12. (Original) The method of Claim 1, further comprising repeating oxidizing and reducing the top of the barrier layer before depositing the conductor directly on the first seed layer.

13. (Original) The method of Claim 12, wherein oxidizing and reducing the top of the barrier layer is repeated between about 10 and 50 times.

14. (Previously presented) The method of Claim 13, wherein oxidizing and reducing the top of the barrier layer is repeated between about 20 and 40 times.

15. (Original) The method of Claim 1, wherein depositing the conductor comprises depositing a second seed layer.

16. (Original) The method of Claim 15, wherein depositing the second seed layer comprises depositing ruthenium.

17. (Original) The method of Claim 3, wherein depositing the second seed layer comprises depositing ruthenium by atomic layer deposition

18. (Original) The method of Claim 15, further comprising depositing copper directly over the second seed layer.

19. (Original) The method of Claim 1, wherein depositing a conductor comprises depositing copper.

20. (Original) The method of Claim 19, wherein depositing copper comprises an electrochemical deposition process.

21. (Original) The method of Claim 19, wherein depositing copper comprises an electroless deposition process.

22. (Original) The method of Claim 19, wherein depositing copper comprises a chemical vapor deposition (CVD) process.

23. (Original) The method of Claim 1, wherein reducing comprises reducing the metal oxide to an elemental metal form.

24. (Original) The method of Claim 1, wherein reducing the oxidation state comprises using hydrogen, hydrogen plasma, or carbon monoxide.

25. (Original) The method of Claim 1, wherein reducing the oxidation state comprises using in situ hydrogen plasma.

26. (Original) The method of Claim 1, wherein reducing the oxidation state comprises using remote hydrogen plasma.

27. (Original) The method of Claim 1, wherein reducing the oxidation state comprises an electrochemical process.

28. (Original) The method of Claim 1, wherein reducing the oxidation state of the metal oxide comprises exposing the metal oxide to a gaseous compound containing a functional from the group comprising alcohol (-OH), aldehyde (-CHO), and carboxylic acid (-COOH).

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

32. (Cancelled)

33. (Currently Amended) A method for metallizing an integrated circuit, the method comprising

forming a diffusion barrier layer on a substrate;

performing a preparation process on the substrate to form a nucleation layer, the preparation process comprising exposing the diffusion barrier layer to an oxidant and a reducing agent;

depositing a conductor over the nucleation layer to form a seed layer that is different from the nucleation layer after the preparation process is complete; and

depositing copper over the seed layer.

34. (Original) The method of Claim 33, wherein depositing the conductor comprises depositing ruthenium.

35. (Original) The method of Claim 33, wherein depositing the conductor comprises depositing a metal by atomic layer deposition.

36. (Original) The method of Claim 33, wherein the preparation process comprises:

exposing the substrate to a pulse of oxygen in a reactor chamber;

purging the reactor chamber with an inert gas;

exposing the substrate to a pulse of hydrogen; and

purging the reactor chamber with an inert gas.

37. (Original) The method of Claim 36, further comprising exposing the substrate to a pulse of a ruthenium source chemical and purging the reactor chamber before exposing the substrate to the oxygen pulse.

38. (Original) The method of Claim 36, wherein the oxygen pulse lasts less than 60 seconds.

39. (Original) The method of Claim 36, wherein the hydrogen pulse lasts less than 60 seconds.

40. (Original) The method of Claim 38, wherein the oxygen pulse lasts between about 5 and 40 seconds.

41. (Original) The method of Claim 39, wherein the hydrogen pulse lasts between about 5 and 40 seconds.

42. (Original) The method of Claim 40, wherein the oxygen pulse lasts between about 10 and 30 seconds.

43. (Original) The method of Claim 41, where the hydrogen pulse lasts about 10 and 30 seconds.

44. (Original) The method of Claim 36, wherein exposing the substrate to the hydrogen pulse comprises exposing the substrate to in situ hydrogen plasma.

45. (Original) The method of Claim 36, wherein exposing the substrate to the hydrogen pulse comprises exposing the substrate to remote hydrogen plasma.

46. (Original) The method of Claim 33, wherein forming the diffusion barrier comprises depositing tungsten nitride carbide.

47. (Original) The method of Claim 33, wherein forming the diffusion barrier comprises depositing molybdenum nitride carbide.

48. (Canceled)

49. (Canceled)

50. (Canceled)

51. (Original) The method of Claim 33, wherein depositing the copper comprises electrochemical deposition.

52. (Original) The method of Claim 33, wherein depositing the copper comprises chemical vapor deposition.

53-62. (Cancelled)

63. (Previously presented) The method of Claim 33, further comprising repeating the preparation process on the substrate n times, wherein n = {1, 2,..., 100};

64. (New) The method of Claim 63, wherein *n* is less than or equal to 100.

65. (New) The method of Claim 64, wherein *n* is between about 10 and 50.

66. (New) The method of Claim 65, wherein *n* is between about 20 and 40.